

# SEQUENCE LISTING

<110> ANDERSON, Peter et al.

<120> Tuberculosis vaccine and diagnostics  
based on the Mycobacterium tuberculosis esat-6 gene family

<130> 0459-0462P

<140> 09/615,947

<141> 2000-07-13

<160> 31

<170> FastSEQ for Windows Version 3.0

<210> 1

<211> 100

<212> PRT

<213> M.Tuberculosis

<400> 1

Met	Ala	Glu	Met	Lys	Thr	Asp	Ala	Ala	Thr	Leu	Ala	Gln	Glu	Ala	Gly
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Asn	Phe	Glu	Arg	Ile	Ser	Gly	Asp	Leu	Lys	Thr	Gln	Ile	Asp	Gln	Val
			20				25					30			
Glu	Ser	Thr	Ala	Gly	Ser	Leu	Gln	Gly	Gln	Trp	Arg	Gly	Ala	Ala	Gly
		35				40					45				
Thr	Ala	Ala	Gln	Ala	Ala	Val	Val	Arg	Phe	Gln	Glu	Ala	Ala	Asn	Lys
		50			55					60					
Gln	Lys	Gln	Glu	Leu	Asp	Glu	Ile	Ser	Thr	Asn	Ile	Arg	Gln	Ala	Gly
65				70				75						80	
Val	Gln	Tyr	Ser	Arg	Ala	Asp	Glu	Glu	Gln	Gln	Ala	Leu	Ser	Ser	
				85				90					95		
Gln	Met	Gly	Phe												
			100												

<210> 2

<211> 95

<212> PRT

<213> M.Tuberculosis

<400> 2

Met	Thr	Glu	Gln	Gln	Trp	Asn	Phe	Ala	Gly	Ile	Glu	Ala	Ala	Ala	Ser
1				5					10					15	
Ala	Ile	Gln	Gly	Asn	Val	Thr	Ser	Ile	His	Ser	Leu	Leu	Asp	Glu	Gly
			20				25						30		
Lys	Gln	Ser	Leu	Thr	Lys	Leu	Ala	Ala	Ala	Trp	Gly	Gly	Ser	Gly	Ser
		35				40					45				
Glu	Ala	Tyr	Gln	Gly	Val	Gln	Gln	Lys	Trp	Asp	Ala	Thr	Ala	Thr	Glu
		50			55				60						
Leu	Asn	Asn	Ala	Leu	Gln	Asn	Leu	Ala	Arg	Thr	Ile	Ser	Glu	Ala	Gly
65				70				75						80	
Gln	Ala	Met	Ala	Ser	Thr	Glu	Gly	Asn	Val	Thr	Gly	Met	Phe	Ala	
				85				90						95	

<210> 3

<211> 96  
 <212> PRT  
 <213> M.Tuberculosis

<400> 3  
 Met Ser Gln Ile Met Tyr Asn Tyr Pro Ala Met Leu Gly His Ala Gly  
 1 5 10 15  
 Asp Met Ala Gly Tyr Ala Gly Thr Leu Gln Ser Leu Gly Ala Glu Ile  
 20 25 30  
 Ala Val Glu Gln Ala Ala Leu Gln Ser Ala Trp Gln Gly Asp Thr Gly  
 35 40 45  
 Ile Thr Tyr Gln Ala Trp Gln Ala Gln Trp Asn Gln Ala Met Glu Asp  
 50 55 60  
 Leu Val Arg Ala Tyr His Ala Met Ser Ser Thr His Glu Ala Asn Thr  
 65 70 75 80  
 Met Ala Met Met Ala Arg Asp Thr Ala Glu Ala Ala Lys Trp Gly Gly  
 85 90 95

<210> 4  
 <211> 294  
 <212> DNA  
 <213> M Tuberculosis

<220>  
 <221> CDS  
 <222> (1) ... (294)

<400> 4  
 atg agc ctt ttg gat gct cat atc cca cag ttg gtg gcc tcc cag tcg  
 48  
 Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Val Ala Ser Gln Ser  
 1 5 10 15  
 gcg ttt gcc gcc aag gcg ggg ctg atg cgg cac acg atc ggt cag gcc  
 96  
 Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala  
 20 25 30  
 gag cag gcg gcg atg tcg gct cag gcg ttt cac cag ggg gag tcg tcg  
 144  
 Glu Gln Ala Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ser  
 35 40 45  
 gcg gcg ttt cag gcc gcc cat gcc cgg ttt gtg gcg gcg gcc gcc aaa  
 192  
 Ala Ala Phe Gln Ala Ala His Ala Arg Phe Val Ala Ala Ala Lys  
 50 55 60  
 gtc aac acc ttg ttg gat gtc gcg cag gcg aat ctg ggt gag gcc gcc  
 240  
 Val Asn Thr Leu Leu Asp Val Ala Gln Ala Asn Leu Gly Glu Ala Ala  
 65 70 75 80  
 ggt acc tat gtg gcc gcc gat gct gcg gcc gcg tcg acc tat acc ggg  
 288  
 Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ala Ser Thr Tyr Thr Gly  
 85 90 95  
 ttc tga  
 294

Phe \*

<210> 5  
<211> 97  
<212> PRT  
<213> M Tuberculosis

<400> 5  
Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Val Ala Ser Gln Ser  
1 5 10 15  
Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala  
20 25 30  
Glu Gln Ala Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ser  
35 40 45  
Ala Ala Phe Gln Ala Ala His Ala Arg Phe Val Ala Ala Ala Lys  
50 55 60  
Val Asn Thr Leu Leu Asp Val Ala Gln Ala Asn Leu Gly Glu Ala Ala  
65 70 75 80  
Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ser Thr Tyr Thr Gly  
85 90 95  
Phe

<210> 6  
<211> 339  
<212> DNA  
<213> M Tuberculosis

<220>  
<221> CDS  
<222> (1) ... (339)

<400> 6  
ttg atc ccc ggt cgg atg gtg ctg aac tgg gaa gat ggc ctc aat gcc  
48  
Leu Ile Pro Gly Arg Met Val Leu Asn Trp Glu Asp Gly Leu Asn Ala  
1 5 10 15  
ctt gtt gcg gaa ggg att gag gcc atc gtg ttt cgt act tta ggc gat  
96  
Leu Val Ala Glu Gly Ile Glu Ala Ile Val Phe Arg Thr Leu Gly Asp  
20 25 30  
cag tgc tgg ttg tgg gag tcg ctg ctg ccc gac gag gtg cgc cga ctg  
144  
Gln Cys Trp Leu Trp Glu Ser Leu Leu Pro Asp Glu Val Arg Arg Leu  
35 40 45  
ccc gag gaa ctg gcc cgg gtg gac gca ttg ttg gac gat ccg gcg ttc  
192  
Pro Glu Glu Leu Ala Arg Val Asp Ala Leu Leu Asp Asp Pro Ala Phe  
50 55 60  
ttc gcc ccg ttc gtg ccg ttc ttc gac ccg cgc agg ggc cgg ccg tcg  
240  
Phe Ala Pro Phe Val Pro Phe Phe Asp Pro Arg Arg Gly Arg Pro Ser  
65 70 75 80

acg ccg atg gag gtc tat ctg cag ttg atg ttt gtg aag ttc cgc tac  
 288  
 Thr Pro Met Glu Val Tyr Leu Gln Leu Met Phe Val Lys Phe Arg Tyr  
                     85                    90                    95

cgg ctg ggc tat gag tcg ctg tgc cgg gag gtg gct gat tcg atc acc  
 336  
 Arg Leu Gly Tyr Glu Ser Leu Cys Arg Glu Val Ala Asp Ser Ile Thr  
                     100                    105                    110

tga  
 339

<210> 7  
 <211> 112  
 <212> PRT  
 <213> M Tuberculosis

<400> 7  
 Met Ile Pro Gly Arg Met Val Leu Asn Trp Glu Asp Gly Leu Asn Ala  
   1                    5                    10                    15  
 Leu Val Ala Glu Gly Ile Glu Ala Ile Val Phe Arg Thr Leu Gly Asp  
                     20                    25                    30  
 Gln Cys Trp Leu Trp Glu Ser Leu Leu Pro Asp Glu Val Arg Arg Leu  
                     35                    40                    45  
 Pro Glu Glu Leu Ala Arg Val Asp Ala Leu Leu Asp Asp Pro Ala Phe  
                     50                    55                    60  
 Phe Ala Pro Phe Val Pro Phe Phe Asp Pro Arg Arg Gly Arg Pro Ser  
  65                    70                    75                    80  
 Thr Pro Met Glu Val Tyr Leu Gln Leu Met Phe Val Lys Phe Arg Tyr  
                     85                    90                    95  
 Arg Leu Gly Tyr Glu Ser Leu Cys Arg Glu Val Ala Asp Ser Ile Thr  
                     100                    105                    110

<210> 8  
 <211> 285  
 <212> DNA  
 <213> M Tuberculosis

<220>  
 <221> CDS  
 <222> (1)...(285)

<400> 8  
 atg acc atc aac tat caa ttc ggg gac gtc gac gct cac ggc gcc atg  
 48  
 Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met  
   1                    5                    10                    15

atc cgc gct cag gcc ggg tcg ctg gag gcc gag cat cag gcc atc att  
 96  
 Ile Arg Ala Gln Ala Gly Ser Leu Glu Ala Glu His Gln Ala Ile Ile  
                     20                    25                    30

tct gat gtg ttg acc gcg agt gac ttt tgg ggc ggc gcc ggt tcg gcg  
 144  
 Ser Asp Val Leu Thr Ala Ser Asp Phe Trp Gly Gly Ala Gly Ser Ala  
                     35                    40                    45

gcc tgc cag ggg ttc att acc cag ctg ggc cgt aac ttc cag gtg atc  
192  
Ala Cys Gln Gly Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile  
50 55 60

tac gag cag gcc aac gcc cac ggg cag aag gtg cag gct gcc ggc aac  
240  
Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn  
65 70 75 80

aac atg gca caa acc gac agc gcc gtc ggc tcc agc tgg gcc taa  
285  
Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala \*

<210> 9  
<211> 94  
<212> PRT  
<213> M Tuberculosis

<400> 9  
Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met  
1 5 10 15  
Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val  
20 25 30  
Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val  
35 40 45  
Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile  
50 55 60  
Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn  
65 70 75 80  
Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala  
85 90

<210> 10  
<211> 285  
<212> DNA  
<213> M Tuberculosis

<220>  
<221> CDS  
<222> (1) ... (282)

<400> 10  
atg acc atc aac tat cag ttc ggt gat gtc gac gct cat ggc gcc atg  
48  
Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met  
1 5 10 15

atc cgc gct cag gcc ggg ttg ctg gag gcg gag cat cag gcc atc gtt  
96  
Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val  
20 25 30

cgt gat gtg ttg gcc gcg ggt gac ttt tgg ggc ggc gcc ggt tcg gtg  
144  
Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val  
35 40 45

gct tgc cag gag ttc att acc cag ttg ggc cgt aac ttc cag gtg atc  
 192  
 Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile  
     50                    55                    60

tac gag cag gcc aac gcc cac ggg cag aag gtg cag gct gcc ggc aac  
 240  
 Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn  
     65                    70                    75                    80

aac atg gca caa acc gac agc gcc gtc ggc tcc agc tgg gcc  
 282  
 Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala  
                     85                    90

tga  
 285

<210> 11  
 <211> 94  
 <212> PRT  
 <213> M Tuberculosis

<400> 11  
 Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met  
   1          5          10          15  
 Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val  
           20          25          30  
 Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val  
           35          40          45  
 Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile  
   50          55          60  
 Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn  
   65          70          75          80  
 Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala  
           85          90

<210> 12  
 <211> 327  
 <212> DNA  
 <213> M Tuberculosis

<220>  
 <221> CDS  
 <222> (1)...(327)

<400> 12  
 gtg ctt ttg cct ctt ggt ccg cct ttg ccg ccc gac gcg gtg gtg gcg  
 48  
 Val Leu Leu Pro Leu Gly Pro Pro Leu Pro Pro Asp Ala Val Val Ala  
   1          5          10          15

aaa cgg gct gag tcg gga atg ctc ggc ggg ttg tcg gtt ccg ctc agc  
 96  
 Lys Arg Ala Glu Ser Gly Met Leu Gly Gly Leu Ser Val Pro Leu Ser  
           20          25          30

tgg gga gtg gct gtg cca ccc gat gat tat gac cac tgg gcg cct gcg  
 144  
 Trp Gly Val Ala Val Pro Pro Asp Asp Tyr Asp His Trp Ala Pro Ala



aac gcc ccg cgt cgg aat cgc gtt ggg cgg caa cat ggt tgg ccg gcc  
 96  
 Asn Ala Pro Arg Arg Asn Arg Val Gly Arg Gln His Gly Trp Pro Ala  
                     20                    25                    30

gac gtt ccg tcc gcc gag cag cgc cgc gcc caa cgg cag cgc gac ctc  
 144  
 Asp Val Pro Ser Ala Glu Gln Arg Arg Ala Gln Arg Gln Arg Asp Leu  
                     35                    40                    45

gag gct atc cgc cga gcg tac gcc gag atg gtg gcg aca tca cac gaa  
 192  
 Glu Ala Ile Arg Arg Ala Tyr Ala Glu Met Val Ala Thr Ser His Glu  
                     50                    55                    60

atc gac gac gac aca gcc gaa ctg gcg ctg ttg tcg atg cat ctc gac  
 240  
 Ile Asp Asp Asp Thr Ala Glu Leu Ala Leu Leu Ser Met His Leu Asp  
                     65                    70                    75                    80

gat gag cag cgc cgg ctt gag gcg ggg atg aag ctc ggc tgg cat ccg  
 288  
 Asp Glu Gln Arg Arg Leu Glu Ala Gly Met Lys Leu Gly Trp His Pro  
                     85                    90                    95

tat cac ttc ccc gac gaa ccc gac agc aaa cag tga  
 324  
 Tyr His Phe Pro Asp Glu Pro Asp Ser Lys Gln \*  
                     100                    105

<210> 15  
 <211> 107  
 <212> PRT  
 <213> M Tuberculosis

<400> 15  
 Met Thr His Lys Arg Thr Lys Arg Gln Pro Ala Ile Ala Ala Gly Leu  
   1                    5                    10                    15  
 Asn Ala Pro Arg Arg Asn Arg Val Gly Arg Gln His Gly Trp Pro Ala  
                     20                    25                    30  
 Asp Val Pro Ser Ala Glu Gln Arg Arg Ala Gln Arg Gln Arg Asp Leu  
                     35                    40                    45  
 Glu Ala Ile Arg Arg Ala Tyr Ala Glu Met Val Ala Thr Ser His Glu  
                     50                    55                    60  
 Ile Asp Asp Asp Thr Ala Glu Leu Ala Leu Leu Ser Met His Leu Asp  
   65                    70                    75                    80  
 Asp Glu Gln Arg Arg Leu Glu Ala Gly Met Lys Leu Gly Trp His Pro  
                     85                    90                    95  
 Tyr His Phe Pro Asp Glu Pro Asp Ser Lys Gln  
                     100                    105

<210> 16  
 <211> 246  
 <212> DNA  
 <213> M Tuberculosis

<220>  
 <221> CDS  
 <222> (1)...(246)



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      <400> 16
atg agc ggc cac gcg ttg gct gct cgg acg ttg ctg gcc gcc gcg gac
48
Met Ser Gly His Ala Leu Ala Ala Arg Thr Leu Leu Ala Ala Ala Asp
  1           5           10           15

gag ctt gtc ggc ggc ccg cca gtc gag gct tcg gcc gcc gcg ctg gcc
96
Glu Leu Val Gly Gly Pro Pro Val Glu Ala Ser Ala Ala Ala Leu Ala
      20           25           30

ggc gac gcc gcg ggc gca tgg cgg acc gcg gcc gtc gag ctt gcg cga
144
Gly Asp Ala Ala Gly Ala Trp Arg Thr Ala Ala Val Glu Leu Ala Arg
      35           40           45

gcg ttg gtc cgc gct gtg gcg gag tcg cac ggc gtc gcg gcc gtt ttg
192
Ala Leu Val Arg Ala Val Ala Glu Ser His Gly Val Ala Ala Val Leu
      50           55           60

ttc gcc gcg acg gcc gcc gcg gcg gcc gtc gac cgg ggt gat ccg
240
Phe Ala Ala Thr Ala Ala Ala Ala Ala Val Asp Arg Gly Asp Pro
      65           70           75           80

ccg tga
246
Pro *
```

```

<210> 17
<211> 81
<212> PRT
<213> M Tuberculosis
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      <400> 17
Met Ser Gly His Ala Leu Ala Ala Arg Thr Leu Leu Ala Ala Ala Asp
  1           5           10           15
Glu Leu Val Gly Gly Pro Pro Val Glu Ala Ser Ala Ala Ala Leu Ala
      20           25           30
Gly Asp Ala Ala Gly Ala Trp Arg Thr Ala Ala Val Glu Leu Ala Arg
      35           40           45
Ala Leu Val Arg Ala Val Ala Glu Ser His Gly Val Ala Ala Val Leu
      50           55           60
Phe Ala Ala Thr Ala Ala Ala Ala Ala Val Asp Arg Gly Asp Pro
      65           70           75           80
Pro
```

```

<210> 18
<211> 294
<212> DNA
<213> M Tuberculosis
```

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<220>
<221> CDS
<222> (1)...(294)
```

<400> 18  
 atg agt ttg ttg gat gcc cat att ccg cag ttg atc gct tcg cat acg  
 48  
 Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Ile Ala Ser His Thr  
 1 5 10 15  
 gcg ttt gcc gct aag gcg ggg ttg atg cgg cat acg atc ggt cag gcc  
 96  
 Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala  
 20 25 30  
 gag cag cag gcg atg tcg gcg cag gcg ttt cat cag gga gag tcc gcg  
 144  
 Glu Gln Gln Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ala  
 35 40 45  
 gcg gcg ttt cag ggt gcg cat gcc cgg ttt gtg gcc gcg gcc gcc aag  
 192  
 Ala Ala Phe Gln Gly Ala His Ala Arg Phe Val Ala Ala Ala Ala Lys  
 50 55 60  
 gtc aat acc ttg ctg gat atc gcg caa gcc aat ttg ggt gag gcc gcg  
 240  
 Val Asn Thr Leu Leu Asp Ile Ala Gln Ala Asn Leu Gly Glu Ala Ala  
 65 70 75 80  
 ggc acg tat gtg gcc gcc gat gcc gcc gcc gcg tcc agc tac acc ggg  
 288  
 Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ala Ser Ser Tyr Thr Gly  
 85 90 95  
 ttt tta  
 294  
 Phe Leu

<210> 19  
 <211> 97  
 <212> PRT  
 <213> M Tuberculosis

<400> 19  
 Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Ile Ala Ser His Thr  
 1 5 10 15  
 Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala  
 20 25 30  
 Glu Gln Gln Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ala  
 35 40 45  
 Ala Ala Phe Gln Gly Ala His Ala Arg Phe Val Ala Ala Ala Ala Lys  
 50 55 60  
 Val Asn Thr Leu Leu Asp Ile Ala Gln Ala Asn Leu Gly Glu Ala Ala  
 65 70 75 80  
 Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ser Ser Tyr Thr Gly  
 85 90 95  
 Phe

<210> 20

<211> 303  
 <212> DNA  
 <213> M Tuberculosis

<220>  
 <221> CDS  
 <222> (1)...(303)

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    <400> 20
atg aac gca gac ccc gtg ttg tgc tac aac ttt gac gcc atc gaa tac
48
Met Asn Ala Asp Pro Val Leu Ser Tyr Asn Phe Asp Ala Ile Glu Tyr
  1             5             10             15

tcc gtt cgt cag gag atc cac acc acc gcg gcc cgt ttc aac gct gcg
96
Ser Val Arg Gln Glu Ile His Thr Thr Ala Ala Arg Phe Asn Ala Ala
      20             25             30

ctg caa gag ctg agg tgc cag atc gcg ccg ttg cag cag ctc tgg aca
144
Leu Gln Glu Leu Arg Ser Gln Ile Ala Pro Leu Gln Gln Leu Trp Thr
      35             40             45

cgg gaa gcg gcc gcc gcc tac cac gcg gag caa ctc aag tgg cac cag
192
Arg Glu Ala Ala Ala Ala Tyr His Ala Glu Gln Leu Lys Trp His Gln
      50             55             60

gcg gcc agc gcg ctc aac gag atc ctg atc gac ttg gga aac gcg gtt
240
Ala Ala Ser Ala Leu Asn Glu Ile Leu Ile Asp Leu Gly Asn Ala Val
      65             70             75             80

cgc cac ggt gcc gac gac gtg gcg cat gcc gac cgg cgg gcg gct gga
288
Arg His Gly Ala Asp Asp Val Ala His Ala Asp Arg Arg Ala Ala Gly
      85             90             95

gct tgg gca cgc tag
303
Ala Trp Ala Arg *
      100
  
```

<210> 21  
 <211> 100  
 <212> PRT  
 <213> M Tuberculosis

```

    <400> 21
Met Asn Ala Asp Pro Val Leu Ser Tyr Asn Phe Asp Ala Ile Glu Tyr
  1             5             10             15
Ser Val Arg Gln Glu Ile His Thr Thr Ala Ala Arg Phe Asn Ala Ala
      20             25             30
Leu Gln Glu Leu Arg Ser Gln Ile Ala Pro Leu Gln Gln Leu Trp Thr
      35             40             45
Arg Glu Ala Ala Ala Ala Tyr His Ala Glu Gln Leu Lys Trp His Gln
      50             55             60
Ala Ala Ser Ala Leu Asn Glu Ile Leu Ile Asp Leu Gly Asn Ala Val
  
```

65                      70                      75                      80  
 Arg His Gly Ala Asp Asp Val Ala His Ala Asp Arg Arg Ala Ala Gly  
                                  85                      90                      95  
 Ala Trp Ala Arg  
                                  100

<210> 22  
 <211> 378  
 <212> DNA  
 <213> M Tuberculosis

<220>  
 <221> CDS  
 <222> (1) ... (378)

<400> 22  
 ttg gtt gaa ccg gga agg atc gga ggg aac cag acg agg ttg gcg gcg  
 48  
 Leu Val Glu Pro Gly Arg Ile Gly Gly Asn Gln Thr Arg Leu Ala Ala  
   1                                 5                                 10                                 15  
 gtc cta ctt gat gtg agc aca ccg aac acg ctg aac gcc gac ttt gac  
 96  
 Val Leu Leu Asp Val Ser Thr Pro Asn Thr Leu Asn Ala Asp Phe Asp  
                                  20                                 25                                 30  
 ctg atg cgt tcg gtt gcg ggt atc acg gac gcc cgc aat gag gaa atc  
 144  
 Leu Met Arg Ser Val Ala Gly Ile Thr Asp Ala Arg Asn Glu Glu Ile  
                                  35                                 40                                 45  
 cgt gcg atg ctg cag gca ttc atc ggc cgc atg agc ggt gtg ccg ccg  
 192  
 Arg Ala Met Leu Gln Ala Phe Ile Gly Arg Met Ser Gly Val Pro Pro  
   50                                 55                                 60  
 tcg gtg tgg ggt ggg ctc gcg gcc gct cgg ttc cag gat gtg gtg gat  
 240  
 Ser Val Trp Gly Gly Leu Ala Ala Ala Arg Phe Gln Asp Val Val Asp  
   65                                 70                                 75                                 80  
 cgc tgg aac gcc gag tcg acg cgg ctc tac cac gtc ctg cac gcg atc  
 288  
 Arg Trp Asn Ala Glu Ser Thr Arg Leu Tyr His Val Leu His Ala Ile  
                                  85                                 90                                 95  
 gcc gac acc atc cgc cac aac gag gcc gcg ctg cgg gaa gcc ggc caa  
 336  
 Ala Asp Thr Ile Arg His Asn Glu Ala Ala Leu Arg Glu Ala Gly Gln  
                                  100                                 105                                 110  
 atc cat gcc cgc cac atc gcc gcc gcc ggc ggc gac cta tag  
 378  
 Ile His Ala Arg His Ile Ala Ala Ala Gly Gly Asp Leu \*  
   115                                 120                                 125

<210> 23  
 <211> 125  
 <212> PRT

<213> M Tuberculosis

<400> 23

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Met Val Glu Pro Gly Arg Ile Gly Gly Asn Gln Thr Arg Leu Ala Ala
1      5      10      15
Val Leu Leu Asp Val Ser Thr Pro Asn Thr Leu Asn Ala Asp Phe Asp
20      25      30
Leu Met Arg Ser Val Ala Gly Ile Thr Asp Ala Arg Asn Glu Glu Ile
35      40      45
Arg Ala Met Leu Gln Ala Phe Ile Gly Arg Met Ser Gly Val Pro Pro
50      55      60
Ser Val Trp Gly Gly Leu Ala Ala Ala Arg Phe Gln Asp Val Val Asp
65      70      75      80
Arg Trp Asn Ala Glu Ser Thr Arg Leu Tyr His Val Leu His Ala Ile
85      90      95
Ala Asp Thr Ile Arg His Asn Glu Ala Ala Leu Arg Glu Ala Gly Gln
100     105     110
Ile His Ala Arg His Ile Ala Ala Ala Gly Gly Asp Leu
115     120     125

```

<210> 24

<211> 288

<212> DNA

<213> M Tuberculosis

<220>

<221> CDS

<222> (1) ... (288)

<400> 24

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atg tca gat caa atc acg tat aac ccg gga gcc gta tcc gac ttc gct
48
Met Ser Asp Gln Ile Thr Tyr Asn Pro Gly Ala Val Ser Asp Phe Ala
1      5      10      15

tcc gac gtg ggc tcg cgc gcc ggc cag ctc cac atg att tac gaa gac
96
Ser Asp Val Gly Ser Arg Ala Gly Gln Leu His Met Ile Tyr Glu Asp
20      25      30

acc gcc agc aaa aca aat gcg ctg caa gag ttt ttc gcg ggc cac ggc
144
Thr Ala Ser Lys Thr Asn Ala Leu Gln Glu Phe Phe Ala Gly His Gly
35      40      45

gcg caa ggg ttt ttc gac gcc cag gcg cag atg ctg tcg ggg ctg cag
192
Ala Gln Gly Phe Phe Asp Ala Gln Ala Gln Met Leu Ser Gly Leu Gln
50      55      60

ggg ctc att gag acg gtg ggt cag cat ggg act acc acc ggc cac gtg
240
Gly Leu Ile Glu Thr Val Gly Gln His Gly Thr Thr Thr Gly His Val
65      70      75      80

ctg gac aac gcg atc gga acc gac cag gcc atc gcg ggc ttg ttc taa
288
Leu Asp Asn Ala Ile Gly Thr Asp Gln Ala Ile Ala Gly Leu Phe *
85      90      95

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<210> 25  
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 <212> PRT  
 <213> M Tuberculosis

<400> 25  
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 Ser Asp Val Gly Ser Arg Ala Gly Gln Leu His Met Ile Tyr Glu Asp  
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 Thr Ala Ser Lys Thr Asn Ala Leu Gln Glu Phe Phe Ala Gly His Gly  
 35 40 45  
 Ala Gln Gly Phe Phe Asp Ala Gln Ala Gln Met Leu Ser Gly Leu Gln  
 50 55 60  
 Gly Leu Ile Glu Thr Val Gly Gln His Gly Thr Thr Thr Gly His Val  
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<210> 26  
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<220>  
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 1 5 10 15  
 aac gat atc cag gcg aat atg gag caa gcc atg gga atc gcc aag ggc  
 96  
 Asn Asp Ile Gln Ala Asn Met Glu Gln Ala Met Gly Ile Ala Lys Gly  
 20 25 30  
 tac cta gcc aac cag gaa aac gtc atg aac ccc gcc acc tgg tct ggt  
 144  
 Tyr Leu Ala Asn Gln Glu Asn Val Met Asn Pro Ala Thr Trp Ser Gly  
 35 40 45  
 acc ggc gtc gtt gct tcg cat atg aca gcc acc gag atc acc aat gaa  
 192  
 Thr Gly Val Val Ala Ser His Met Thr Ala Thr Glu Ile Thr Asn Glu  
 50 55 60  
 ttg aac aag gtc ctt acc ggg ggc acg cgc ctg gcc gag ggc ctc gtg  
 240  
 Leu Asn Lys Val Leu Thr Gly Gly Thr Arg Leu Ala Glu Gly Leu Val  
 65 70 75 80  
 cag gcc gca gcc ctg atg gag gga cac gag gcg gac tcg cag aca gcg  
 288  
 Gln Ala Ala Ala Leu Met Glu Gly His Glu Ala Asp Ser Gln Thr Ala  
 85 90 95

ttt cag gcg ctg ttc ggc gct agc cac gga tcc tga

324

Phe Gln Ala Leu Phe Gly Ala Ser His Gly Ser \*  
100 105

<210> 27

<211> 107

<212> PRT

<213> M Tuberculosis

<400> 27

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Asn	Asp	Ile	Gln	Ala	Asn	Met	Glu	Gln	Ala	Met	Gly	Ile	Ala	Lys	Gly
			20					25					30		
Tyr	Leu	Ala	Asn	Gln	Glu	Asn	Val	Met	Asn	Pro	Ala	Thr	Trp	Ser	Gly
		35					40					45			
Thr	Gly	Val	Val	Ala	Ser	His	Met	Thr	Ala	Thr	Glu	Ile	Thr	Asn	Glu
		50				55					60				
Leu	Asn	Lys	Val	Leu	Thr	Gly	Gly	Thr	Arg	Leu	Ala	Glu	Gly	Leu	Val
65					70				75					80	
Gln	Ala	Ala	Ala	Leu	Met	Glu	Gly	His	Glu	Ala	Asp	Ser	Gln	Thr	Ala
				85					90					95	
Phe	Gln	Ala	Leu	Phe	Gly	Ala	Ser	His	Gly	Ser					
			100					105							

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<220>

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<222> (1) ... (273)

<400> 28

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Val	Asp	Pro	Thr	Val	Leu	Ala	Asp	Ala	Val	Ala	Arg	Met	Ala	Glu	Phe
1				5					10					15	

ggt cgc cac gtc gag gag ctg gtc gcc gag att gag tcc ttg gtt acc  
96

Gly	Arg	His	Val	Glu	Glu	Leu	Val	Ala	Glu	Ile	Glu	Ser	Leu	Val	Thr
			20					25					30		

cgg ctg cat gtg acg tgg acg ggg gag ggc gcg gcg gct cat gct gag  
144

Arg	Leu	His	Val	Thr	Trp	Thr	Gly	Glu	Gly	Ala	Ala	Ala	His	Ala	Glu
		35					40					45			

gcg caa cga cat tgg gct gcc ggt gag gcg atg atg cgc cag gcg ttg  
192

Ala	Gln	Arg	His	Trp	Ala	Ala	Gly	Glu	Ala	Met	Met	Arg	Gln	Ala	Leu
		50				55					60				

gcc cag ctc acg gcc gcg ggg cag agc gcg cac gcc aac tac acc ggc  
240

Ala	Gln	Leu	Thr	Ala	Ala	Gly	Gln	Ser	Ala	His	Ala	Asn	Tyr	Thr	Gly
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